NASA Facts

AIM For The Clouds

AIM is a two-year mission to study Polar Mesospheric Clouds (PMCs), the Earth's highest clouds, which form an icy membrane 50 miles above the surface at the edge of space.

These clouds, which are visible from the ground with the naked eye, form in the spring and summer at high latitudes and have been seen for over a century, reflecting the Sun's light in the twilight sky. While one and the same phenomenon, they are called Noctilucent Clouds (NLCs) when observed from the ground at twilight and PMCs when viewed from space platforms with instruments that can sense their presence at any time of the night or day. Previous satellites have inferred the presence of PMCs but were not designed to determine their properties.

The PMCs, believed to be made of frozen ice crystals, form in the summer polar region in the coldest place in the atmosphere 50 miles above the Earth's surface. Noctilucent Clouds were first observed in 1885 by an amateur astronomer and have been becoming brighter, more frequent and appear to be moving to lower latitudes in recent years.

The primary goal of the AIM mission is to explain why PMCs form in the first place and what is causing the mysterious changes in their behavior.

The AIM satellite carries three state-of-the-art instruments: Cloud Imaging and Particle Size (CIPS), Solar Occultation For Ice Experiment (SOFIE) and the Cosmic Dust Experiment (CDE). Each will take precise measurements of NLCs and related parameters in the Earth's upper atmosphere.

CIPS has four cameras positioned at different angles, allowing scientists a 2-D look at the clouds as the satellite passes and looks back at them. Multiple views of the clouds from different angles allow a determination of the sizes of the ice particles that make up the cloud. The cameras will provide panoramic PMC images of the polar cap daily.

SOFIE will use solar occultation to measure cloud particles, temperature and atmospheric gases involved in forming the clouds. The instrument will reveal the recipe of chemicals that prompt PMCs' formation. It will provide the most accurate and comprehensive look to date of ice particles and chemicals within the clouds as well as of the environment in which the clouds form.

CDE records the amount of space dust that enters the atmosphere from the cosmos. It will allow scientists to determine the role the particles have in PMC formation.

By observing the PMCs, chemicals and small dust particles for at least two years, the AIM mission is designed to answer the most important questions about the origin of these mysterious clouds.

AIM is 55 inches tall and 43 inches wide and weighs 430 pounds. Once in orbit, solar arrays will deploy to power the satellite. The satellite will be launched from Vandenberg Air Force Base, Calif., on a Pegasus-XL launch vehicle to its orbit 600 km (373 miles) above Earth.

AIM is a NASA-funded SMall EXplorers (SMEX) mission managed by the Explorers Program Office at Goddard Space Flight Center, Md. The mission is led by the Principal Investigator from the Center for Atmospheric Sciences at Hampton University in Va. The Laboratory for Atmospheric and Space Physics (LASP), University of Colorado – Boulder, is building the CIPS and CDE instruments. LASP also manages the AIM mission and will control the satellite after launch. The Space Dynamics Laboratory, Utah State University, is building the SOFIE instrument. Other research institutions involved include the University of Alaska-Fairbanks, University of Colorado-Boulder, Boulder, Colo.; Utah State University, North Logan, Utah; Gats, Inc., Newport News, Va; the Naval Research Laboratory, Wash, DC; George Mason University, Fairfax, Va.; and the British Antarctic Survey, Cambridge UK.

Orbital Sciences Corporation, Dulles, Va, designed, manufactured and tested the AIM spacecraft. Orbital will also provide the Pegasus launch vehicle.

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For additional information, visit: **http://aim.hamptonu.edu/**